vibrations are induced by retrieving waveform data from a memory associated with the haptic feedback system and either generating at least one waveform based on the retrieved waveform data to induce the canceling vibration, or using data representative of a stored suppression waveform. As noted previously, where the suppression waveforms are based on previously performed calibrations, the suppression waveforms may have been iteratively refined to account even for other suppression waveforms, and may thus be far more complex than the out of phase, amplitude adjusted signals used to provide a clear disclosure of the principles herein. The generation of those relatively complex suppression waveforms is considered to be within the level of those skilled in the art, having the benefit of the present disclosure. In another example, the canceling waveforms are produced dynamically based on sensed data. The method terminates at **508**.

[0033] It should be understood that the flow diagram **500** depicted in FIG. **5** is an illustrative example of a particular embodiment, and is not intended to be limiting. Further, it should be understood that other steps may be added and/or steps may be combined without departing from the spirit and scope of this disclosure. For example, in a particular implementation, elements **504** and **506** may be combined. In other implementations, a delay may be introduced between elements **504** and **506** to allow time for propagation of the vibrations before the canceling waveform is applied.

[0034] In conjunction with the systems and methods described above and depicted with respect to FIGS. **1-5**, an input device is disclosed that includes a haptic feedback system to provide localized tactile feedback at a selected input location while suppressing vibratory crosstalk (propagating vibrations) at other input locations. In an example, a controller is adapted to selectively activate one or more actuators of an array of actuators using a first waveform to produce a vibration at a selected input location and to activate other actuators using one or more second waveforms to produce canceling vibrations to suppress propagation of vibrations at other input locations. The haptic feedback systems and methods disclosed with respect to FIGS. **1-5** above can be used with any multi-input interface and is not limited to keyboards, keypads, or touch screen interfaces. For example, the haptic feedback system can be used in connection with a multi-touch track pad. Additionally, the described techniques may be used with additional sensor signals, or measurements derived from such signals to refine detection of events creating data extraneous to the movement and other positioning information. Many additional modifications and variations may be made in the techniques and structures described and illustrated herein without departing from the spirit and scope of the present invention.

We claim:

1. A processing system having a haptic feedback system, comprising:

a plurality of actuators configured to provide tactile feedback associated with an input surface, each actuator adapted to be activated independently of the other actuators; and

a controller configured to activate a first actuator of the plurality of actuators to induce a first vibration at a selected contact location of the input surface and to activate a second actuator to induce a second vibration at a second location.

2. The processing system of claim **1**, wherein the controller is configured to drive the first actuator with a first waveform to produce vibrations.

3. The processing system of claim **2**, wherein the controller is configured to drive the second actuator with a second waveforms configured to suppress propagating vibrations from the first induced vibration.

4. The processing system of claim **3**, wherein the controller is adapted to detect the propagating vibrations at the second location of the input surface and to determine the respective second waveform dynamically in response to the detection.

5. The processing system of claim **3**, further comprising a memory containing a plurality of suppression waveforms; and wherein the controller is adapted to access the memory to retrieve the second waveform from the plurality of suppression waveforms.

6. The processing system of claim **5**, wherein each of the plurality of waveforms is configured to at least partially cancel propagating vibrations at the input surface proximate to a particular actuator.

7. The processing system of claim **1**, wherein the plurality of actuators comprises a plurality of electrically actuable circuit elements to produce vibrations in response to signals from the controller.

8. A computing system, comprising:

a touch-sensitive interface configured to receive an input at a selected contact location of a surface;

a plurality of actuators coupled to the contact surface, a first actuator located proximate the selected contact location; and

a controller configured to selectively activate the first actuator with a first signal configured to induce a first vibration at the selected contact location and to selectively activate a second actuator at a second location with a second signal configured to induce a vibration having a frequency and amplitude configured to suppress vibratory crosstalk from the first vibration at the second location.

9. The computing system of claim **8**, further comprising:

a plurality of touch-sensitive sensors associated with the touch-sensitive interface, each sensor configured to detect a contact with the touch-sensitive interface and to produce an input signal related to the detected contact; and

wherein the controller selectively activates the first actuator in response to the detected contact.

10. The computing system of claim **9**, wherein the plurality of touch-sensitive sensors is configured to detect multiple contacts with the touch-sensitive interface at multiple contact locations, and wherein the controller is adapted to selectively activate the plurality of actuators to provide localized tactile feedback at each of the multiple contact locations.

11. The computing system of claim **9**, further comprising a memory containing first data representative of the first signal to generate the first vibration, and contains second data representative of the second signal to generate the second vibration.

12. The computing system of claim **8**, wherein the touch-sensitive interface comprises a track pad.

13. The computing system of claim **8**, wherein the touch-sensitive interface comprises a keypad or a keyboard.

14. The computing system of claim **8**, wherein the touch-sensitive interface comprises a touch screen.